Amendments to the Claims:

This listing of all pending claims (including withdrawn claims) will replace all prior versions, and listings, of claims in the application. Cancelled and not entered claims are indicated with claim number and status only. The claims show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

Please AMEND claim 29 as follows:

1. (Previously Presented) An interface member wiring design support apparatus, comprising:

an arithmetic control unit configured to calculate a wiring shape of an interface member on a basis of a plurality of input fixing positions and a modulus of deformation of an interface member so as to satisfy the fixing positions; and

a display unit configured to display the wiring shape of the interface member calculated by said arithmetic control unit,

wherein said arithmetic control unit calculates a flexural rigidity E of a target interface member by a predetermined bi-quadratic function associated with a curvature ρ of the interface member on a basis of an input interface member diameter ϕ, and calculates a wiring shape of the interface member by using the calculated flexural rigidity E.

2. (Original) The apparatus according to claim 1, wherein the predetermined bi-quadratic function is

flexural rigidity $E = f(\phi, p) = G\,(a_0(\phi) + a_1(\phi)\,\rho + a_2(\phi)\,\rho^2) \times K$

where $a_0(\phi)$, $a_1(\phi)$, and $a_2(\phi)$ are predetermined constants corresponding to the interface member diameter ϕ, G is a gravitational acceleration, and K is a constant determined in accordance with a type of protective member.

3. (Previously Presented) The apparatus according to claim 1, wherein said arithmetic control unit uses a maximum curvature of a target interface member as the curvature ρ to calculate the flexural rigidity E.

4. (Original) The apparatus according to claim 1, wherein the predetermined bi-

quadratic function is set such that the calculated flexural rigidity E decreases as the curvature ρ increases.

5. (Previously Presented) The apparatus according to claim 1, wherein

said wiring design support apparatus further comprises a storage unit in which as moduli of a plurality of types of interface members which can be selected as design targets, a relationship between diameters ϕ of the interface members, torsional rigidities C of the interface members, and weights of the interface members per unit length is stored in advance, and

said arithmetic control unit calculates a wiring shape of a target interface member on a basis of the flexural rigidity E calculated by the predetermined bi-quadratic function and the torsional rigidity C and a weight per unit length supplied from said storage unit in accordance with the diameter ϕ of the target interface member.

6. (Previously Presented) The apparatus according to claim 5, wherein said arithmetic control unit calculates a wiring shape of the target interface member by substituting the flexural rigidity E, the torsional rigidity C, and the weight per unit length into Konapasek's mathematical expressions.

7. (Previously Presented) An interface member wiring design support apparatus, comprising:

an arithmetic control unit configured to calculate a wiring shape of an interface member on a basis of a plurality of input fixing positions and a modulus of deformation of an interface member so as to satisfy the fixing positions; and

a display unit configured to display the wiring shape of the interface member calculated by said arithmetic control unit,

wherein said arithmetic control unit, when calculating a wiring shape of a target interface member, calculates forces acting at the plurality of fixing positions due to the interface member, and said display unit displays information associated with the forces calculated by said arithmetic control unit.

8. (Previously Presented) The apparatus according to claim 7, wherein said display unit displays a magnitude and direction of each force as the information associated with the forces.

9. (Previously Presented) The apparatus according to claim 7, wherein if any of the

forces exceeds a predetermined value set in advance as a design strength at each of the respective fixing positions when said display unit displays the information associated with the forces, said arithmetic control unit generates a corresponding warning.

10. (Original) The apparatus according to claim 7, wherein said arithmetic control unit can designate degrees of freedom at the plurality of fixing positions with respect to the target interface member as input items for the fixing positions.

11. (Original) The apparatus according to claim 7, wherein

said arithmetic control unit can designate, as a degree of freedom at the fixing position, whether the interface member can rotate at the fixing position in a normal direction, and

when the fixing position is designated as a position at which the interface member can rotate, said arithmetic control unit calculates a force that causes the interface member to rotate in the normal direction as a force applied to the fixing position by the interface member.

12. (Previously Presented) The apparatus according to claim 7, wherein said arithmetic control unit calculates a flexural rigidity E of the target interface member by a predetermined bi-quadratic function associated with a curvature ρ of the interface member on the basis of an input interface member diameter ϕ, and calculates a wiring shape of the interface member by using the calculated flexural rigidity E.

13. (Previously Presented) An interface member wiring design support apparatus, comprising:

an arithmetic control unit configured to calculate a wiring shape of an interface member on a basis of a plurality of input fixing positions, fixing directions at the fixing positions, and a modulus of deformation of the interface member so as to satisfy the fixing positions; and

a man-machine interface configured to be capable of designating whether a target interface member can rotate in a normal direction at least at one fixing position of the target interface member,

wherein, when at least one fixing position is designated by said man-machine interface as a position at which the interface member can rotate, said arithmetic control unit calculates a shape of the interface member, and calculates a force that causes the interface member to rotate in the normal direction at the designated fixing position.

14. (Original) The apparatus according to claim 13, wherein

a fixing position that can be designated by said man-machine interface as a position at which the interface member can rotate or cannot rotate is an end portion position of the interface member, and position information input as the end portion position is a temporary fixing position which can be moved by said arithmetic control unit in calculating a shape of the interface member, and

when position information common to a plurality of target interface members is designated by said man-machine interface as the temporary fixing position at one end portion of the plurality of interface members, said arithmetic control unit calculates an overall shape of a composite interface member constituted by the plurality of interface members including the common position information as a branch point and a dynamically balancing position of the overall shape to which the branch point should be located by recalculating the overall shape every time the common position information is moved by a predetermined amount.

15. (Previously Presented) The apparatus according to claim 13, wherein said arithmetic control unit calculates a flexural rigidity E of the interface member by a predetermined bi-quadratic function associated with a curvature ρ of the interface member on a basis of an input interface member diameter ϕ, and calculates a wiring shape of the interface member by using the calculated flexural rigidity E.

16. (Previously Presented) An interface member wiring design support apparatus, comprising:

an arithmetic control unit configured to calculate a wiring shape of an interface member on a basis of at least three fixing positions, fixing directions at the fixing positions, and a modulus of deformation of the interface member so as to satisfy the fixing positions; anda display unit configured to display the wiring shape of the interface member calculated by said arithmetic control unit,

wherein when a target interface member includes a branch point, said arithmetic control unit calculates a shape of an interface member including the branch point, and a dynamically balancing position at which the branch point is to be located owing to the shape.

17. (Previously Presented) The apparatus according to claim 16, wherein said arithmetic control unit calculates a breaking force produced at the branch point, and said display unit displays the breaking force calculated by said arithmetic control unit.

18. (Previously Presented) The apparatus according to claim 16, wherein said arithmetic control unit calculates a flexural rigidity E of the interface member by a predetermined bi-quadratic function associated with a curvature ρ of the interface member on a basis of an input interface member diameter ϕ, and calculates a wiring shape of the interface member by using the calculated flexural rigidity E.

19. (Previously Presented) A computer-implemented interface member wiring design support method of calculating an interface member wiring shape on a basis of a plurality of fixing positions and a modulus of deformation of an interface member so as to satisfy the fixing positions, comprising:

calculating a flexural rigidity E of a target interface member by a predetermined bi-quadratic function associated with a curvature ρ of the interface member on a basis of an input interface member diameter ϕ, and calculating a wiring shape of the interface member by using the calculated flexural rigidity E.

20. (Original) The method according to claim 19, wherein the predetermined bi-quadratic function is

flexural rigidity $E = f(\phi, \rho) = G\,(a_0\,(\phi) + a_1(\phi)\,\rho + a_2(\phi)\,\rho^2) \times K$

where $a_0(\phi)$, $a_1\,(\phi)$, and $a_2(\phi)$ are predetermined constants corresponding to the interface member diameter ϕ, G is a gravitational acceleration, and K is a constant determined in accordance with a type of protective member.

21. (Original) The method according to claim 19, wherein the predetermined bi-quadratic function is set such that the calculated flexural rigidity E decreases as the curvature ρ increases.

22. (Previously Presented) The method according to claim 19, wherein said calculating includes:

specifying in advance, as moduli of a plurality of types of interface members which can be selected as design targets, a relationship between diameters ϕ of the interface members, torsional rigidities C of the interface members, and weights per unit length of the interface members; and

calculating a wiring shape of the target interface member on a basis of the flexural rigidity

E calculated by the predetermined bi-quadratic function and the specified torsional rigidity C and specified weight per unit length in accordance with the diameter ϕ of the target interface member.

23. (Cancelled)

24. (Previously Presented) A computer-implemented interface member wiring design support method of calculating a wiring shape of an interface member on a basis of a plurality of fixing positions and a modulus of deformation of the interface member so as to satisfy the fixing positions, comprising:

calculating, when calculating a wiring shape of a target interface member, forces acting at the plurality of fixing positions due to the interface member; and

displaying information associated with the calculated forces,

wherein the information displayed includes magnitudes and directions of the calculated forces.

25. (Cancelled)

26. (Previously Presented) A computer-implemented interface member wiring design support method of calculating a wiring shape of an interface member on a basis of a plurality of fixing positions and a modulus of deformation of the interface member so as to satisfy the fixing positions, comprising:

calculating, when calculating a wiring shape of a target interface member, forces acting at the plurality of fixing positions due to the interface member; and

displaying information associated with the calculated forces,

wherein said calculating includes:

designating, as input item for the plurality of fixing positions with respect to the target interface member, whether the interface member can rotate or cannot rotate in a normal direction at the fixing position; and

calculating, when the fixing position is designated as a position at which the interface member can rotate, a force that causes the interface member to rotate in the normal direction as a force applied to the fixing position by the interface member.

27. (Previously Presented) A computer-implemented interface member wiring design

support method of calculating a wiring shape of an interface member on a basis of a plurality of fixing positions and a modulus of deformation of the interface member so as to satisfy the fixing positions, comprising:

calculating, when calculating a wiring shape of a target interface member, forces acting at the plurality of fixing positions due to the interface member; and

displaying information associated with the calculated forces,

wherein said calculating includes:

calculating a flexural rigidity E of the target interface member using a predetermined bi-quadratic function associated with a curvature ρ of the interface member on the basis of an input interface member diameter ϕ, and

calculating a wiring shape of the target interface member is calculated by using the calculated flexural rigidity E.

28. (Previously Presented) A computer-implemented interface member wiring design support method of calculating a wiring shape of an interface member on a basis of a plurality of input fixing positions, fixing directions at the fixing positions, and a modulus of deformation of the interface member so as to satisfy the fixing positions, comprising:

designating whether a target interface member can rotate in a normal direction at least at one fixing position of the target interface member; and

calculating a shape of the interface member when at least one fixing position is designated as a position at which the interface member can rotate, and calculating a force that causes the interface member to rotate in the normal direction at the designated fixing position.

29. (Currently Amended) The method according to claim 28, wherein

a fixing position that is designated in said designation ~~step~~ as a position at which the interface member can rotate or cannot rotate is an end portion position of the interface member, and position information input as the end portion position is a temporary fixing position which can be moved in calculating a shape of the interface member, and

when position information common to a plurality of target interface members is designated as the temporary fixing position at one end portion of the plurality of target interface members, an overall shape of a composite interface member constituted by the plurality of interface members including the common position information as a branch point and a dynamically balancing position of the overall shape to which the branch point should be located are calculated, by recalculating the overall shape every time the common position information is

moved by a predetermined amount.

30. (Previously Presented) The method according to claim 28, wherein a flexural rigidity E of the interface member is calculated by a predetermined bi-quadratic function associated with a curvature ρ of the interface member on a basis of an input interface member diameter ϕ, and the wiring shape of the interface member is calculated by using the calculated flexural rigidity E.

31. (Previously Presented) A computer-implemented interface member wiring design support method, comprising:

calculating a wiring shape of an interface memberon a basis of at least three fixing positions, fixing directions at the fixing positions, and a modulus of deformation of the interface member so as to satisfy the fixing positions; and

displaying the calculated wiring shape of the interface member,

wherein said calculating includes, when a target interface member includes a branch point, a shape of an interface member including the branch point, and a dynamically balancing position at which the branch point is to be located owing to the shape.

32. (Previously Presented) The method according to claim 31, whereina flexural rigidity E of the interface member is calculated by a predetermined bi-quadratic function associated with a curvature ρ of the interface member on a basis of an input interface member diameter ϕ, and the wiring shape of the interface member is calculated by using the calculated flexural rigidity E.

33. (Original) A computer-readable storage medium storing a program code which causes a computer to operate as said interface member wiring design support apparatus defined in claim 1.

34. (Original) A computer-readable storage medium storing a program code which causes a computer to implement the interface member wiring design support method defined in claim 7.

35. (Original) A computer-readable storage medium storing a program code which causes a computer to operate as said interface member wiring design support apparatus

defined in claim 13.

36. (Original) A computer-readable storage medium storing a program code which causes a computer to operate as said interface member wiring design support apparatus defined in claim 16.

37. (Original) A computer-readable storage medium storing a program code which causes a computer to implement the interface member wiring design support method defined in claim 19.

38. (Cancelled)

39. (Original) A computer-readable storage medium storing a program code which causes a computer to implement the interface member wiring design support method defined in claim 28.

40. (Original) A computer-readable storage medium storing a program code which causes a computer to implement the interface member wiring design support method defined in claim 31.

41. (Original) A computer-readable storage medium storing a program code which causes a computer to implement the interface member wiring design support method defined in claim 24.

42. (Original) A computer-readable storage medium storing a program code which causes a computer to implement the interface member wiring design support method defined in claim 26.

43. (Original) A computer-readable storage medium storing a program code which causes a computer to implement the interface member wiring design support method defined in claim 27.